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Research on Construction, Updating, and Iteration Mechanisms for Higher Vocational Education Textbooks: A Perspective of Industry Education Integration

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Abstract

Textbooks represent the core carrier of talent cultivation in vocational education, with construction quality and update velocity directly influencing the adaptability and competitiveness of high-skilled workforce development. As Chinese vocational education enters a new phase of deepening reform across critical teaching elements, industry-education integration and school-enterprise collaboration continue to advance at an accelerated pace. The rapid iteration of industrial technologies has imposed increasingly stringent requirements on the currency, structural flexibility, and long-term governance of higher vocational textbooks. From the analytical perspective of industry-education integration, this study systematically examines the opportunities and challenges confronting higher vocational textbook construction in the contemporary era. We identify prominent deficiencies in current textbooks pertaining to content currency, structural form, development stakeholders, and governance mechanisms. Drawing on policy analysis and institutional innovation frameworks, we propose optimization pathways across four dimensions: school-enterprise collaborative development models, loose-leaf and digital textbook construction, dynamic updating mechanisms, and quality assurance systems. These recommendations provide theoretical reference and practical insights for constructing a high-quality vocational education textbook system with Chinese characteristics.

Keywords

Higher vocational education; Textbook development; Content iteration; Industry-education integration; Loose-leaf textbooks; Digital textbooks

Introduction

Vocational education and general education constitute two distinct yet equally important educational typologies. As the primary carrier of curriculum content and foundational basis for instructional activities, textbooks represent the most tangible manifestation of vocational education's typological characteristics, while

simultaneously serving as critical infrastructure for implementing the fundamental task of fostering virtue through education and cultivating high-quality technical and skilled talent (Ministry of Education, 2026). In early 2026, the Ministry of Education promulgated the Opinions on Deepening the Reform of Key Elements of Vocational Education Teaching, which designated majors, curricula, textbooks, teaching staff, and practical training as the five core elements of vocational education pedagogy—a framework that builds on the "14th Five-Year Plan" Vocational Education Planning Textbook Construction agenda launched five years earlier (Ministry of Education, 2021). This policy framework explicitly calls for improving organizational mechanisms for collaborative development among schools, enterprises, and industries, realizing co-authorship, co-sharing, co-utilization, and co-promotion across the three stakeholders, and establishing a triple-lead editorial mechanism for textbook development, with joint stewardship from enterprise technical experts, academic program leaders, and authoritative industry experts. The overarching objective is to systematically integrate new methodologies, technologies, processes, standards, and equipment into textbook content in a timely manner.

From an industrial development perspective, emerging sectors including artificial intelligence, big data, intelligent manufacturing, the low-altitude economy, and green energy are experiencing rapid growth, with accelerating technology iteration cycles and escalating competency requirements for occupational positions. The long-standing textbook revision rhythm—minor touch-ups every few years and full rewrites on a longer cycle—has fallen notably out of step with the speed of industrial change. From an educational reform perspective, initiatives including project-based instruction, modular curricula, the vocational skill level certificate system, and vocational undergraduate education continue to advance, creating new demands for textbook structure, content organization, and presentation modalities. From a technological perspective, digital and intelligent technologies have profoundly transformed teaching and learning modalities, with new formats such as digital textbooks, AI-enabled instruction, and virtual simulation training continually emerging, driving profound changes in both the connotation and extension of textbooks.

Against this backdrop, the construction of a higher vocational textbook system adapted to industrial upgrading and technological iteration, coupled with the establishment of a responsive and efficient updating mechanism, has emerged as a critical imperative for the high-quality development of vocational education. This paper systematically examines the current state, challenges, and development pathways of higher vocational textbook construction, informed by contemporary policy orientations and practical advancements.

1. Contemporary Requirements for Higher Vocational Textbook Development

The broader context shaping vocational textbook development has shifted considerably in recent years. What was once understood principally as a vehicle for knowledge transfer now operates as a multi-purpose platform for competency building, value formation, and collaborative engagement between colleges and industries. Four interrelated dimensions capture the main requirements driving this transformation.

1.1. Value Orientation: Implementing the Fundamental Task of Fostering Virtue Through Education

Textbook development represents a core governance function that reflects national will. Higher vocational textbooks must be guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, fully implementing the Party's educational policy. The socialist core values must be organically integrated into textbook content, with curriculum ideological and political elements reflecting industry characteristics and professional features systematically incorporated into instructional resource libraries and teaching case repositories. This approach realizes the organic unity of knowledge transmission, competency development, and value guidance (State Council, 2019). For textbooks in subjects with strong ideological content, the long-standing principle of coordinated compilation, centralized review, and uniform adoption remains the guiding framework. For specialized course textbooks, moral and civic elements—craftsman spirit, professional ethics, national security awareness, and green development consciousness—belong woven into the professional content, turning the textbook itself into a vehicle for character formation.

1.2. Currency: Alignment with Industrial Technology Iteration

The typological nature of vocational education dictates that textbook content must maintain resonance with industrial development. Currently, the new round of scientific and technological revolution and industrial transformation is advancing in depth, with emerging technologies, processes, norms, and equipment continually emerging, effectively shortening the "shelf life" of textbook content. Field observations suggest that textbooks for information technology and intelligent manufacturing programs often fall behind industry practice within two to three years of publication, leaving gaps between what students learn and what employers currently expect (Chinese Vocational and Technical Education, 2024). The currency requirement necessitates establishing dynamic textbook update mechanisms to incorporate emerging industrial knowledge, technologies, and methodologies into instructional content in a timely manner, thereby achieving seamless alignment between academic learning and enterprise application.

1.3. Practicality: Orientation Toward Vocational Competency Development

Practicality constitutes the most distinctive feature of vocational education. Higher vocational textbooks need to shift away from the traditional knowledge-centered model toward a competence-centered framework, reconstructing content along the lines of systematic work processes (Cai, 2026). Learning units gain real traction when they revolve around actual production projects, typical work tasks, and engineering cases—an arrangement that lets theory and practice interlock rather than travel on separate tracks. Underlying this design is the principle of learning-by-doing for both teacher and student: project-driven, task-based, and modular approaches help learners build knowledge, develop competence, and mature professionally as they work through each assignment.

1.4. Learner-Centeredness: Supporting Personalized Student Development

Student intake in vocational colleges has grown more diverse, drawing from general high school graduates, separate-admission tracks, counterpart vocational channels, and socially recruited cohorts, which means learners arrive with noticeably different backgrounds and starting points. Textbook development must adhere to student-centered principles, fully considering the cognitive characteristics and learning foundations of diverse student populations. This requires designing flexible structures integrating foundational and extended content, incorporating learning strategy guidance, and supporting self-directed and personalized learning. At the same time, textbooks benefit from evolving beyond teaching-centric materials into resources that also support independent study, with sustained attention to helping students build capacity for lifelong learning and long-term career growth.

2. Identified Challenges in Current Higher Vocational Textbook Systems

Vocational textbook development has made notable progress in recent years: the planned textbook system has steadily improved, and new-format textbooks have proliferated. Even so, measured against the standards of high-quality development in the new era, a number of long-standing shortcomings persist (Ji, 2019).

2.1. Content Obsolescence and Insufficient Industrial Adaptability

Content timeliness is the most frequently cited concern about current vocational textbooks. The traditional textbook development pipeline—from project approval and compilation to publication and classroom adoption—typically requires 1–2 years, with revision cycles of 3–5 years, while industrial technology iteration cycles have shortened to 1–2 years or less. This temporal mismatch is particularly pronounced in rapidly evolving fields such as artificial intelligence, new energy, and the digital economy, creating significant "time gaps" between textbook content and industrial reality. Consequently, discontinuities frequently emerge between what

students learn in academic settings and actual enterprise requirements. Many textbooks continue to follow disciplinary system frameworks, emphasizing theoretical knowledge over practical application, and failing to adequately reflect latest industry standards, authentic enterprise process flows, and core occupational competency requirements.

2.2. Homogeneous Development Stakeholders and Superficial Industry-Education Integration

Policy documents have long called for joint development between colleges and enterprises, yet in practice the depth and reach of enterprise involvement stay relatively narrow. On one hand, some enterprises perceive textbook compilation as an additional burden lacking sufficient incentive structures. On the other hand, school-enterprise collaborative development lacks institutionalized benefit alignment mechanisms and long-term governance guarantees. Enterprise technical personnel participation often remains at the level of nominal participation or manuscript review, failing to systematically translate authentic enterprise technology systems, process standards, and management norms into textbook content. While the formal proportion of industry and enterprise experts on compilation teams has increased, substantive participation remains insufficient across most programs.

2.3. Monolithic Format and Lagging Digital Transformation

Print still dominates the vocational textbook landscape. Although the proportion of supplementary digital resources has increased, most implementations remain at the superficial level of "print textbooks + PowerPoint presentations + answer keys." New-format digital textbooks featuring genuine interactivity, immersive experiences, and personalization remain limited in number. The promotion of loose-leaf and workbook-style textbooks has exhibited formalization tendencies, with some textbooks merely changing binding formats while retaining disciplinary chapter structures, failing to achieve genuine modular reconstruction centered on work tasks. Standard specifications for digital textbooks remain underdeveloped, with poor resource interoperability across platforms, impeding large-scale implementation.

2.4. Incomplete Quality Assurance and Governance Mechanisms

Quality inconsistency remains a stubborn challenge across the field. In some higher vocational colleges, factors including professional title evaluation and achievement recognition have driven phenomena of faculty self-compiled, self-used textbooks and low-level redundant construction. Although textbook review mechanisms have been widely established, review processes predominantly focus on political direction and ideological content, with insufficient in-depth evaluation of content

scientific validity, currency, and vocational adaptability. Textbook selection and evaluation mechanisms remain imperfect, utilization feedback channels are not well-developed, and systematic tracking and evaluation of textbook quality impacts on learning outcomes are lacking, resulting in insufficient data-driven decision support for textbook updating.

3. Optimization Pathways for Textbook Construction, Updating, and Iteration

To address these challenges and align with the broader reform of vocational education's core teaching elements, textbook development needs to move forward on four fronts—the development model, format innovation, updating mechanisms, and quality assurance—so as to build a system that integrates colleges and industries, responds nimbly to change, and operates efficiently.

3.1. Deepening School-Enterprise Collaboration: Multi-Stakeholder Co-Construction Mechanisms

The core of textbook development lies in content, and the source of content lies in industry. Closing the gap between textbook content and industrial reality ultimately depends on building deeper, more structured collaboration in how textbooks are developed.

To begin with, the triple-lead editorial model deserves fuller implementation. This mechanism, as proposed by the Ministry of Education, delineates clear rights, responsibilities, and divisions of labor among three stakeholder groups: enterprise technical experts, responsible for providing authentic work tasks, process flows, technical standards, and enterprise cases; academic program leaders, responsible for translating industrial requirements into instructional content and designing pedagogical logic and learning pathways; and authoritative industry experts, responsible for guiding industry development directions to ensure textbook forward-lookingness and authority.

A second priority is to build stable, ongoing platforms for joint textbook development between colleges and enterprises. Municipal industry-education consortia and industry-wide integration alliances already offer a natural backbone; building collaboration platforms on top of them lets colleges and enterprises pool resources across institutional boundaries. Industry leaders and specialized, sophisticated, distinctive, and innovative enterprises make natural partners for joint textbook R&D centers; together with vocational colleges they can convert in-house resources—training modules, operation manuals, quality inspection protocols—into textbook material, letting resources flow both ways between industry and education.

Third, the incentives for enterprises to take part need sharpening. Certification schemes for industry-education integrated enterprises and evaluations of

school-enterprise cooperation can weight textbook development more meaningfully, backed by policy incentives and public recognition for enterprises that contribute the most. Both sides can also explore compensation and recognition schemes for technical staff who join the writing process, and fold textbook development outcomes into professional title evaluation and performance reviews—moves that raise the appeal of participating.

3.2. Innovating Textbook Formats: Advancing Loose-Leaf and Digital Textbook Development

Innovating how textbooks are packaged and delivered offers one key lever for making them more adaptable and flexible. Loose-leaf, workbook-style, and digital formats all merit stronger investment, giving learners and teachers access to a multi-format, multi-dimensional textbook system.

What gives loose-leaf textbooks their value, however, is not the removable binding itself but what lies beneath it. The key lies in reforming content organization modalities. Beginning with an analysis of typical work tasks, content gets reorganized along work-process logic, and each learning task takes shape as a relatively self-contained loose-leaf unit—replaceable, addable, or removable as technologies evolve (Chinese Vocational and Technical Education, 2024). A well-designed task unit packs in a full set of components: learning objectives, task description, prerequisite knowledge, operational steps, quality standards, evaluation feedback, and extension materials. The result integrates theory with practice and gives students room to direct their own learning.

Digital textbook development and AI-driven knowledge base construction both deserve acceleration. Digital transformation opens a clear path forward: textbooks no longer need to be static printed pages but can become dynamic, intelligent learning resources. Micro-lecture videos, virtual simulations, interactive exercises, and online assessments all find a home in a well-constructed digital textbook, and together they support genuinely blended online and offline learning. AI-supported textbooks—built on large language models and domain-specific knowledge bases—also merit exploration, opening the door to smarter content updates, sharper learning diagnostics, and more personalized learning pathways. Yunnan Vocational College of Mechanical and Electrical Engineering, for example, has developed a specialized large model for green electricity that supports intelligent lesson planning, post competency profiling, and task-based curriculum construction—a concrete case worth studying as digital textbooks become more intelligent.

An ecosystem linking textbook, course, and learning space is worth cultivating. Coordinating textbook writing, curriculum building, and resource-library development as a single ecosystem—one textbook, one online course, one learning space—drives all three forward together. Within that ecosystem, the textbook stops

being merely something to read, whether on paper or screen, and becomes a hub linking classroom learning, independent study, practical training, and workplace experience—with teaching resources designed and deployed in tandem.

3.3. Establishing Dynamic Updating Mechanisms: Enhancing Textbook Iteration Efficiency

Slow updating is arguably the single biggest bottleneck holding back textbook quality. A full-chain dynamic updating mechanism spanning demand collection, content updating, review, and release must be established to enable agile textbook response to industrial changes.

The first pillar of such a mechanism is regular, systematic collection of industrial demand. Existing information channels with industries and enterprises already provide a base; colleges can build monitoring and early-warning systems on top of them to track technological updates, standard changes, and occupational shifts, producing demand lists that steer textbook updates. Municipal consortia and industry-wide integration alliances also have a role to play: regular talent-demand forecasts and program-development guidance reports give textbook updates a clearer directional steer. Technical liaison arrangements between colleges and partner enterprises offer another channel, ensuring that new technologies, processes, and equipment find their way into teaching materials without unnecessary delay.

A second pillar is differentiated updating, matched to the pace of each professional field. Update cycles naturally vary by field. In fast-moving areas like information technology and artificial intelligence, yearly refreshes plus occasional full rewrites fit the pace, and digital or loose-leaf formats let content iterate quickly; in more stable traditional fields, systematic revisions on the academic year calendar still make sense. Fast-track channels for urgent updates add further agility: content touching on workplace safety, technical standard revisions, or regulatory changes can be revised and released promptly, without waiting for the next full cycle.

Third, a closed loop of use, feedback, and improvement belongs at the heart of the system. Evaluating textbook effectiveness through multiple channels—instructor feedback, student evaluations, employer satisfaction surveys, and graduate tracking—builds a far richer picture of quality than any single measure. Analytical tools then step in to pinpoint weaknesses and prioritize what needs updating. Linking evaluation results to project approval, revision, and retirement decisions creates a virtuous cycle: stronger textbooks survive and thrive, while weaker ones get replaced. Well-received, high-quality textbooks merit continued support for further refinement; outdated or poorly evaluated textbooks deserve retirement and replacement without unnecessary delay.

3.4. Improving Quality Assurance Systems: Strengthening Whole-Process Textbook Governance

Producing high-quality textbooks depends on a comprehensive quality assurance system covering every stage. Quality awareness must be embedded throughout the entire process of textbook planning, compilation, review, selection, and evaluation.

Most immediately, review standards need to be applied rigorously. The principle of universal review—covering every compilation, adoption, and implementation—belongs in everyday practice, with tiered and categorized review systems built up and refined over time. Review panels benefit from looking beyond political orientation and ideology, giving substantial weight as well to scientific accuracy, vocational relevance, and technical advancement. Panels work best when they draw on disciplinary scholars, industry and enterprise experts, frontline teachers, and teaching researchers, and when compiler-reviewer separation and conflict-of-interest rules keep the process professional and impartial.

Second, the planning and project-approval process needs strengthening. Careful textbook construction planning matters too: type, quantity, and timetable all need to align with each college's professional group layout and key development priorities. Project approval calls for rigorous selection, and approved projects need monitoring from start to finish—mid-term inspections and final acceptance checks help keep construction on schedule and on quality. Joint applications across colleges and enterprises make good sense, pooling the strongest resources to produce the strongest textbooks.

Third, capacity building for those who write and develop textbooks matters enormously. The foundation of textbook quality lies in compilation team expertise. Sustained training in vocational curriculum theory, textbook development methodology, loose-leaf design, and digital resource production can lift faculty capabilities substantially. Supporting faculty members in undertaking enterprise attachments helps them stay abreast of industry frontiers, build hands-on engineering experience, and lay the groundwork for textbooks that genuinely resonate with practice. Recognition and incentives for textbook development—counting outstanding outcomes toward promotion, performance appraisal, and awards—help make the work both rewarding and visible.

4. Conclusion

Building a strong vocational textbook system is a systematic undertaking that bears directly on the quality of talent cultivation and on what makes vocational education distinctive as a type. In the new phase of deepening vocational education teaching element reform, textbook development must transcend traditional conceptual constraints, taking industry-education integration as the fundamental pathway, competency development as the core orientation, digital transformation as an important driving force, and mechanism innovation as a strong guarantee. The overarching objective is to construct a modern vocational education textbook system characterized by advanced content, flexible formats, diverse stakeholders,

and efficient iteration.

Looking ahead, as artificial intelligence, big data, and related technologies become more deeply embedded in education, textbooks will grow more intelligent in form, more agile in how they update, and more personalized in how they serve learners. Vocational colleges that embrace a more open outlook, take a more proactive stance, and pursue more pragmatic measures stand the best chance of deepening textbook reform, so that textbooks genuinely underpin the cultivation of high-quality technical and skilled talent—and in turn, strengthen the human capital base for industrial upgrading and national strategic priorities.

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